

WHAT IS CLAIMED IS:

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1. A silicon-backed microdisplay comprising:
a silicon die;
5 a silicon-side conductive layer disposed on the silicon die;
a silicon-side passivation layer disposed on the silicon-side
conductive layer;
a cover glass;
a glass-side conductive layer disposed on the cover glass;
10 a glass-side passivation layer of a predetermined material and
thickness disposed on the glass-side conductive layer; and
liquid crystal material sandwiched between the glass-side
passivation layer and the silicon-side passivation layer;
15 wherein the thickness and material of the glass-side passivation layer are
predetermined to improve the work function balance between a combination of
the glass-side conductive layer and the glass-side passivation layer and a
combination of the silicon-side passivation layer and the silicon-side conductive
layer,
thereby providing a silicon-backed microdisplay with reduced visible
20 flicker.

2. The silicon-backed microdisplay of claim 1 wherein the silicon-
side conductive layer is formed of aluminum, the silicon-side passivation layer
is formed of silicon dioxide and silicon nitride, and the glass-side conductive
25 layer is formed of indium-tin-oxide.

3. The silicon-backed microdisplay of claim 2 wherein the glass-
side passivation layer includes SiO_2 .

30 4. The silicon-backed microdisplay of claim 2 wherein the glass-
side passivation layer includes Al_2O_3 .

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5. The silicon-backed microdisplay of claim 2 wherein the glass-side passivation layer includes BeO.

5 6. The silicon-backed microdisplay of claim 2 wherein the glass-side passivation layer includes MgF₂.

10 7. The silicon-backed microdisplay of claim 2 wherein the glass-side passivation layer material includes a material selected from the oxide material group consisting of CeO₂, In₂O₃, MgO, SnO₂, Ta₂O₅, TiO₂, Y₂O₃, ZnO, and any combinations thereof.

15 8. The silicon-backed microdisplay of claim 1 wherein the predetermined thickness of the glass-side passivation layer is in the range of 300 angstroms to 900 angstroms.

9. The silicon-backed microdisplay of claim 1 wherein the work function balance is less than 0.5 eV.

20 10. The silicon-backed microdisplay of claim 1 wherein the work function balance is less than 0.3 eV.

11. The silicon-backed microdisplay of claim 1 wherein the glass-side passivation layer improves the work function balance by at least 0.1 eV.

25 12. A silicon-backed microdisplay comprising:
a silicon die;
a silicon-side conductive layer formed of aluminum disposed on the silicon die;

a silicon-side passivation layer formed of silicon dioxide and silicon nitride, the silicon-side passivation layer disposed on the silicon-side conductive layer;

5 a cover glass;

a glass-side conductive layer formed of indium-tin-oxide disposed on the cover glass;

a glass-side passivation layer disposed on the glass-side conductive layer; and

10 liquid crystal material sandwiched between the glass-side passivation layer and the silicon-side passivation layer;

wherein the thickness and material of the glass-side passivation layer are predetermined to improve the work function balance between a combination of the glass-side conductive layer and the glass-side passivation layer and a combination of the silicon-side passivation layer and the silicon-side conductive layer.

15 thereby providing a silicon-backed microdisplay with reduced visible flicker.

13. The silicon-backed microdisplay of claim 12 wherein the glass-side passivation layer includes SiO₂.

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14. The silicon-backed microdisplay of claim 12 wherein the glass-side passivation layer includes Al₂O₃.

25 15. The silicon-backed microdisplay of claim 12 wherein the glass-side passivation layer includes BeO.

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